

**EDP AUDITING
AN ANNOTATED BIBLIOGRAPHY**

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INTRODUCTION

The literature of the accounting profession increasingly is focusing on the computer revolution and its tremendous impact on auditors. Knowledge required by practicing auditors seems to grow exponentially as computers become standard operating equipment for smaller and smaller organizations. In addition to having proficiency in the language and concepts of data processing, many feel auditors should become involved in the systems development process itself to ensure that new, expensive systems are equipped with adequate controls from the very beginning. Auditing around the computer is no longer a viable approach in many cases, and auditors have to find ways to deal with the complexities of online, realtime databases, the likelihood of invisible audit trails, and the problems of dealing with potentially hostile data processing managers.

This bibliography includes literature on these topics as well as others relating to EDP auditing from 1980 through 1982. A previous GAO Library bibliography published in 1979 and entitled Internal Auditing in the Government includes a chapter on the EDP audit, and can be referred to when information prior to 1980 is needed. Short annotations have been included to help the reader determine the usefulness of individual citations. All documents included in this bibliography are available in the GAO Technical Library. The bibliography attempts to include the majority of EDP audit-related journal literature that has been published in periodicals to which the library subscribes, including key titles such as Internal Auditing, Journal of Systems Management, Accountancy, Journal of Accountancy, CPA Journal, and others. It also includes several well-known monographic texts. GAO reports dealing with the topic which were not covered in the Internal Auditing bibliography and which may be valuable to the reader include:

- Additional GAO audit standards: auditing computer based systems (1979)
- Assessing reliability of computer output: audit (AFMD-81-91, June 1981)
- Auditing ADP: Selected articles (1979)

GAO blue cover reports have not been included in this bibliography. For assistance in finding other materials on the subject, or to obtain items listed here, contact the Technical Library staff in Room 6536, or call 275-5180.

EDP AUDITING: AN OVERVIEW

BOOKS

Auditing Computer Systems. Port Jefferson Station, N.Y.: FTP Technical Library, 1981. RFF QA76

This four-volume manual has been designed to fulfill three objectives: to provide information necessary to establish the EDP audit function; to outline tools, techniques and approaches for use in performing effective computer auditing; and to provide a methodology to evaluate the EDP audit function. The manual has 24 distinct sections and material in these sections is updated as necessary. .A8 v.1-4

Cornick, Delroy L. Auditing in the Electronic Environment: Theory, Practice and Literature. Mt. Airy: Lomond Books, 1981. HF5548 .2

This book has been designed as a ready reference work on the theoretical aspects of EDP auditing. Issues examined include: computer security and abuse; auditing through the computer rather than around the computer; and computer-assisted auditing techniques. It also includes almost 200 pages of annotated bibliographies covering material published from 1959 to 1979. .C67

Jancura, Elise G. and Robert Boos. Establishing Controls and Auditing the Computerized Accounting System. New York: Van Nostrand Reinhold, 1981. HF5548 .2 .J35

Jancura discusses computer auditing and computer controls in this text by providing material on the theory behind a topic and then by using examples to provide illustrations. Chapters on EDP controls, controls in system design and development, and computer-assisted audit techniques are included in this comprehensive and well-written work.

- Lott, Richard W. Auditing the Data Processing Function. New York: HF5548
 Amacon, 1980. .2
 The author divides this work into five segments, each describing one .L599
 aspect of data processing. It begins with a discussion of preinstalla-
 tion activities and follows through to an analysis of computer center
 operations. Each of these chapters suggest standards for the activity
 being described, as well as documentation necessary at each step.
- Macchiaverna, Paul R. Auditing Corporate Data-Processing Activities. HF5548
 New York: The Conference Board, 1980. .2
 This book presents information concerning EDP auditors' chief .M213
 responsibilities, major problems, training, and career development. The
 information was obtained from a questionnaire sent to EDP auditors at 164
 companies. Selected case studies also are provided.
- Perry, William E. Selecting EDP Audit Areas. Altamonte Springs: HF5667
 EDP Auditors Foundation, 1980. .P47
 This 82-page audit guide concentrates primarily on determining
 methods for allocating EDP resources. The author claims his book pro-
 vides two tools to aid the auditor in this task: developing procedures
 for establishing objectives for the EDP audit function, and a methodology
 for setting priorities of EDP audit areas by severity of risk involved.
- Porter, W. Thomas, and William E. Perry. EDP Controls and Auditing. HF5667
 Boston: Kent Publishing Co., 1981. .P636
 This book discusses controls in EDP systems, case studies, problems 1981
 involved in auditing real-time systems, and problems with records pro-
 duced by computer service systems. It has been revised to include infor-
 mation on the Foreign Corrupt Practices Act and also includes new material
 on computerized audit techniques. Appendices include a case study, an
 EDP controls questionnaire, a review of computer concepts, and a sample
 documentation standards manual for a medium-sized installation.

- Sardinas, Joseph L., John G. Burch, Jr., and Richard J. Asebrook. EDP Auditing, A Primer. New York: John Wiley, 1981. HF5548
 .2
 Computer-assisted audit techniques, basic computer concepts, and EDP controls are three chief areas examined in this book. Each chapter is followed by a brief summary, and review questions also are provided. Several case studies are appended. .S36
- Taylor, Donald H., and G. William Glezen. Auditing: Integrated Concepts and Procedures. New York: John Wiley, 1982. HF5667
 .T29
 One chapter on EDP auditing is included in this textbook. Chapter 9 addresses differences between batch and online processing, compliance tests in EDP systems, and the AICPA's position on internal controls in EDP systems. 1982
- Weber, Ron. EDP Auditing: Conceptual Foundations and Practice. New York: McGraw-Hill, 1982. HF5548
 .2
 Designed for EDP practitioners as well as students, this book presumes a knowledge of auditing, data processing, and a programming language. Chapters discuss the following topics: the need for audits of computers; methods of control; generalized audit software; and auditing techniques. The book concludes with an examination of legal, social, and technological influences on the EDP auditing profession. Exercises, case studies and bibliographies are provided at the end of each chapter. .W35
- Yarnall, Kent F. "Auditing in an EDP Environment." In Handbook of Accounting and Auditing. Ed. John C. Burton, Russell E. Palmer, and Robert S. Kay. Boston: Warren, Gorham & Lamont, 1982. REF
 HF5635
 .H213
 This 45-page chapter in a comprehensive accounting text provides readers with an excellent overview of the topic. It begins with a short discussion of why EDP has had a significant impact on accounting controls, and continues by examining audit techniques and tools, including test decking, integrated test facilities, parallel simulation, and generalized computer audit software. Methods for planning the EDP portion of an audit are presented. A short bibliography also is provided.

JOURNALS

Crump, Deryk. "Computers--What Should Worry Auditors?" Accountancy, 91, No. 1047 (November 1980), 45-46.

This article presents the results of a questionnaire sent to the 250 largest accounting firms in the United Kingdom on the subject of internal control weaknesses in computer systems in various categories. Some of the most serious concerns included: data capture, batch control totaling and recording procedures, inadequate error correction in data prep departments, and the physical handling of source documents.

"Data Management: Internal Control of EDP Systems." CPA Journal, 5, No. 4 (April 1981), 86, 88.

This article briefly mentions the differences between general EDP controls and application controls; the former being related to the entire EDP system, while the latter relates specifically to input, processing, and output controls. It also outlines available controls, independent test data counts, and hardware controls.

Doria, Robert G. "Development of an EDP Audit Plan." CPA Journal, 51, No. 12 (December 1982), 86-87.

Methods for setting up an EDP audit plan are the focus of this brief article. The first step in the establishment of an EDP audit plan is to obtain management commitment to the plan. An overview is then required. The author describes the overview as a document used to identify all the systems used by an organization and also to help staff understand how these systems relate to each other. An overview can consist of a narrative systems flowchart, and overall flowchart. The next step in the development of an audit plan is to rank systems on a priority basis. Finally, the audit plan should take into consideration the nature of the work already performed on the system and remaining work to be done.

Dorricott, Keith O. "Computer Auditing is No Longer Optional."

CA Magazine, 115, No. 3 (March 1982), 66-69.

This article discusses the publication of the CICA's guide, "Auditing in An Electronic Data Processing Environment" and the two prevalent reactions to it--relief that it had finally been published, and uncertainty as to its usefulness. The rest of the article explores two common problems relating to the evaluation of internal control in computerized accounting systems. These problems are: the tendency of general audit personnel to ignore computerized parts of the systems, and the failure of computer specialists to evaluate the computer system as an integral part of the total system.

Doud, Wallace C. "Auditing the New Information World." The Internal Auditor, 39, No. 4 (August 1982), 40-44.

New technologies are making increased demands on internal auditors. Computers are operating at higher speeds. Storage devices make online interaction increasingly available. Non-data processing professionals are using these sophisticated systems to a greater degree. The author maintains that the two fundamental characteristics of new computer systems are diversity of use and interactivity. One of the major problems faced by organizations in dealing with these new characteristics is the lack of an enforced policy enabling them to control new information systems. Any policy the organization might already have should be re-examined to determine: 1) is it being enforced? 2) do adequate audit trails exist? 3) how well trained is the audit staff? 4) are there policies governing usage of home computers by the staff?

"Exposure Draft: Auditing Guideline--Auditing in a Computer Environment." Accountancy, 93, No. 1062 (February 1982), 113-119.

This article includes the text of two draft auditing guidelines governing internal controls in computer-based accounting systems and computer-assisted audit techniques. These have been developed by the Institute of Chartered Accountants in England and Wales; The Institute of Chartered Accountants of Scotland; the Institute of Chartered Accountants in Ireland; and the Association of Certified Accountants.

Harborth, N. L. "Internal Controls in Automated Systems Application Programs." Air Force Comptroller, 15, No. 2 (April 1981), 30-34.

Computer systems are being designed without adequate attention to security, internal control, and privacy issues. Systems are vulnerable to fraud, unauthorized use, and misappropriations by dishonest or disgruntled employees. Lack of visible audit trails can be a problem, as can errors in data entry and flaws in telecommunication systems. Potential violation of the Privacy Act is possible as more personal data is stored on computer systems. These problems can be alleviated through the use of access controls to restrict system use, accuracy checks to compare stored inputs to stored data before data is accepted by the system, and the construction of an audit trail. Extensive documentation concerning the system's capabilities also should be maintained.

Hick, Willard E. "Eliminating the EDP Audit Function." Internal Auditor, 37, No. 3 (June 1980), 92-96.

The author believes there are four phases in the development of an EDP audit function. Phase I is called ignore-ance. In this phase company management views the staff as a necessary evil but also tends to overlook the value of what the staff could produce. Propulsion is the next phase, during which audit managers realize that computers are important, and that they should initiate an EDP audit function. The lustrous phase is characterized by deeper involvement by auditors in system design, analysis of control processing, and the review of system test results. The final phase is emancipation, during which all auditors perform all aspects of any audit. This is discussed in detail in part 2 of the article.

Hick, Willard E. "Eliminating the EDP Audit Function, Part II." Internal Auditor, 37, No. 4 (August 1980), 75-80.

This article discusses the process by which Massachusetts Mutual Life Insurance Company developed an entire audit staff capable of handling computer environments, including how the firm handled the problems of training, standardization of job descriptions, and career development. Before the reorganization, there was inadequate communication between EDP audit staff and other audit sections. The EDP audit staff was disbanded and new functional audit areas were created that examined manual and computerized routines of the audits to which they were assigned. The author describes the reorganization as a move from a lustrous to an emancipated audit environment.

Kukura, Andrew. "Operational Audits of Data Processing Organizations and Management Information Systems." The Government Accountants Journal, 31, No. 1 (Spring 1982), 54-57.

Kukura provides an overview of the components of a data processing audit. The following steps are discussed: planning the audit and organizing the audit team; conducting the preliminary survey; developing the detailed work plan and schedule; conducting the audit, including special attention to planning, organization, performance and operations, and control; and documenting results and report preparation.

Larimer, Richard D. "How Information Managers Can Use EDP Audit Preparation to Streamline DP." DM, Data Management, 20, No. 5 (May 1982), 12-14.

An EDP audit can be a productive experience for data processing personnel and this article explains what DP management can expect from an audit as well as how best to prepare for it. EDP audits usually cover three areas: management, systems, and operations. DP personnel should examine each area ahead of the audit. This can provide management with an excellent opportunity for streamlining data processing. The article includes an example of an EDP audit review questionnaire and a worksheet for program change.

Mastromano, F. M. "The Changing Nature of the EDP Audit." Management Accounting, 62, No. 1 (July 1980), 27-30, 34.

The author provides brief background information on how EDP auditing has changed since the advent of the first computer systems. Because the scope of EDP auditing has become greater than that of the manual system audit, he feels guidelines governing the EDP audit should be initiated. These guidelines should address the following issues: access control to computer systems and problems associated with distributed processing; provisions to be made in the case of natural disasters; system and program testing; and required documentation. Standardized guidelines are necessary because of the changes in hardware and software used for data processing and must be communicated to management to ensure effective implementation.

Murray, William. "Audit Window into the Computer." EDPACS, 8, No. 6 (December 1980), 11-14.

The article presents a hypothetical audit of a hypothetical and idealized computer system. The steps the auditor would perform, from logging on to the system to sampling accounts online, are presented.

Norris, Paul N. "Peer Review of EDP Audit." Internal Auditor, 39, No. 1 (February 1982), 29-34.

Corporate executives are becoming more concerned about their information systems, which are increasingly costly, contribute less than what was hoped for, and often lack reasonable controls. They are taking steps to remedy this situation by establishing EDP audit functions in their organizations. The article describes a pilot internal audit peer review sponsored by the Institute of Internal Auditors.

Rollier, Bruce. "Two Teams, One Goal." Datamation, 28, No. 4
(April 1982), 183-184.

Data administrators and auditors share many objectives. By working together, these two groups can develop complementary long-range strategies. Both groups must recognize that controls, to be effective, should be built into the information system early in the development cycle. The auditor is best qualified to determine which controls are necessary, and data administrators can determine how controls should be implemented. The article discusses potential advantages of a data dictionary as a support tool for an information system. The author concludes that auditors always should be involved in data administration planning functions involving controls and auditability.

Saratore, F. Anthony, and James H. Schlessler. "EDP Audits: Nothing to Fear, Plenty to Gain." DM, Data Management, 20, No. 5 (May 1982), 10-11.

An EDP audit group often is met with fear by the data processing department of the organization they plan to audit. This frequently is due to a lack of communication between the audit group and EDP management. The author presents a scenario in which the two groups come into conflict and discusses how such a situation can be avoided, stressing the use of good communication techniques.

Sclafani, William G. "What Accountants Are Asking About Computer Auditing." The Practical Accountant, 13, No. 1 (January/February 1980), 59-61.

The author addresses several frequently asked questions concerning computer auditing. The question-answer format is used to discuss types of audit controls which can be used to audit through the computer; who should review EDP controls, and why the review of EDP activities is important. AICPA Statements on Auditing Standards are cited where applicable.

Scrivasen, C. A., and Paul E. Dascher. "Performing a Management Audit of EDP Operations." Financial Executive, 48, No. 11 (November 1980), 30-36.

The author discusses three levels of management audits of EDP systems. These are: system review; auditing the computer center; and the issue audit. The role of top management in the initiation and performance of the audit is briefly discussed.

THE ROLE OF THE EDP AUDITOR

BOOKS

Backe, Steve. The EDP Internal Audit Function: A Research Study on the Role of the EDP Internal Auditor. Diss. University of Nevada, Reno 1981. Ann Arbor: University of Microfilms International, 1982. HF5679 .B34

This dissertation examines the role of the EDP auditor and asserts there is an "identity crisis" in the profession. The first half of this study includes the historical background of auditing, the role of the auditor in the EDP environment, and a theoretical examination of role models throughout history. The rest of this dissertation includes the results of a survey of EDP auditors employed in banks in nine western states. The author examines pertinent characteristics of the EDP auditors based on the survey results.

JOURNALS

Brill, A. E. "EDP Auditors' Tales of Horror." Journal of Systems Management, 33, No. 1 (January 1982), 20-22.

Brill looks at the world of the EDP auditor from the viewpoint of the data processing manager. Failure to communicate is pointed out as a major problem between these two groups, often resulting in extremely negative audit reports of DP departments. The failure of DP managers to include auditors in key decision making processes is counter-productive and can be very frustrating to auditors. Data processing is a high-risk operation that has been plagued with poor controls. DP managers should impress upon their staff the need for control consciousness and cooperation with EDP auditors.

Brown, Nander. "Making the EDP Audit Specialist Part of the Audit Team."

Internal Auditor, 37, No. 1 (February 1980), 11-15.

Audit teams increasingly need to acquire an EDP audit specialist to provide them with data processing skills. This article briefly discusses how an organization might acquire an EDP specialist and how this individual might be integrated into the staff. Abilities needed by this specialist are outlined, including skills such as in-depth technical capabilities and an awareness of external influences on the auditing profession.

Gallegos, E. "The Need for a Better Trained EDP Auditor." GAO Review,

17, No. 1 (Winter 1982), 49-51.

The proliferation of computer systems and advances in technology have led to increased demands for EDP auditors. These individuals must continually upgrade their skills to keep up with new software advancements, including telecommunications, teleprocessing, microcircuitry, firmware, and embedded system technology. Legal issues such as privacy, fraud, and interstate data transfer, also must be considered. The author discusses methods available to auditors for the acquisition of these skills. Universities are offering courses in various programs leading to competence in information systems auditing. The role of government agencies and "Big Eight" Accounting firms in contributing to the advancement of knowledge in this area is also mentioned.

Howard, Clifford Judson, Jr. "EDP-izing the Internal Audit Staff."

Internal Auditor, 39, No. 2 (April 1982), 30-31.

Howard discusses various levels of proficiency needed by auditors in order to interact intelligently with data processing staff. All internal auditors need to acquire knowledge in the following areas: hardware, operating systems, tape-management systems, computerese, flowcharting, and computer controls. Management must provide refresher training for auditors and must motivate staff to use their new EDP skills. The article also discusses the Standards for the Professional Practice of Internal Auditing. While the standards do not specifically mention EDP expertise, it may be difficult to execute these professional responsibilities without some EDP knowledge.

Litecky, Charles R. "EDP Audit Job Definitions: How Does Your Staff Compare?" Internal Auditor, 38, No.2 (April 1981), 57-61.

Presents the results of a survey of internal EDP auditors designed to determine what tasks they regularly perform. Results of this survey indicated the existence of five different types of EDP positions, including that of the EDP auditor specialist, which primarily involves auditing and reviewing the EDP part of an accounting system. The next position was identified as an EDP auditor-programmer, whose responsibilities include programming and software design. Other positions included EDP audit managers, advanced EDP audit software specialists, and internal auditors with EDP responsibilities.

Miller, Frederick W. "EDP Auditor: Obsoleting the Old Role." Infosystems, 27, No. 6 (June 1980), 66-70.

Miller discusses the impact of computers on auditing, including the change in focus from balance-sheet and results audits to process audits. He also briefly discusses the impact of the Foreign Corrupt Practices Act on the liability of auditors. Three areas of technological change impacting auditing also are considered. These are: the migration of business into automated segments of processing; reduction in the amount of hard documentation available to auditors; and the dependability of business on service from the computer. As a result, auditors must be "bi-lingual" by being able to understand data processing as well as accounting principles.

Myers, Edith. "Confusion Marks EDP Auditing." Datamation, 26, No. 2 (April 1980), 82-83.

Covers a number of problems faced by today's EDP auditors, including legislation holding them responsible for the adequacy of controls they examine (Foreign Corrupt Practices Act). In addition, new privacy laws limit the access of auditors to private information, such as corporate personnel files. As a result of these developments, auditors can be placed in an uncomfortable CATCH 22. The article also discusses the need for provision of audit input into the design phase of systems development.

Pleier, Joseph R. "A Game Plan for Auditing EDP Systems." Internal Auditor, 39, No. 3 (June 1982), 42-43.

Strategies for obtaining information on EDP auditing are presented. A short list of key books on EDP auditing is included, as well as a description of organizations offering formal training on the subject. On-the-job training also is presented as a means of obtaining EDP knowledge.

Reilly, Robert F., and John A. Lee. "Developing In-House EDP Auditing Capabilities." Management Review, 70, No. 4 (April 1981), 57-61.

The authors present a case study of how the Huffy Corporation, a Midwestern manufacturer, developed and staffed a new EDP audit specialist position. Senior management considered the implementation of controls on their EDP systems to be an important task, which led them to the development of a job description for an internal auditor/EDP audit specialist. Management then had to decide whether to staff the positions from within the company or from the outside. Initial and long-term results then are discussed.

Savitch, Richard S. "Organizing Audits in EDP Environments." CPA Journal 50, No. 8 (August 1980), 22-28.

This article includes the results of interviews with auditors in 10 CPA firms concerning how EDP personnel are organized in each firm, and what audit procedures and techniques are used. All firms questioned provide some training on internal controls within their organizations. Workloads relating to EDP auditing required between 20 and 50 percent of an EDP specialist's time. Use of personnel other than EDP specialists also is discussed.

Skudena, V. J. "The Status of EDP Auditing." CPA Journal, 52, No. 3 (March 1982), 26-31.

The accounting curriculum has not kept up with developments in EDP auditing, despite the increased use of computers in the business world which accounting graduates are likely to encounter. According to one study, almost all colleges surveyed were offering the same basic accounting courses that were offered 40 years ago. Auditing textbooks are not up-to-date. The author recommends increased communication between industry and academia on EDP topics; special sessions of introductory data processing courses for accounting students; and the use of a team approach to teach auditing, utilizing several specialists in auditing and data processing.

Tussing, Robert T., and Glen L. Helms. "Training Computer Audit Specialists--An Experimental Academic Program for the Experienced Independent Auditor." Journal of Accountancy, 150, (July 1980), 71-74.

The authors contend that a formal academic program combining accounting and data processing is the best path to technical competence. The article then outlines eight abilities needed by computer auditors, identified by the AICPA Committee On Auditing EDP Systems.

SMALL COMPUTERS: AUDITING THE MINIS AND MICROS

BOOKS

Audit and Control Considerations in a Minicomputer or Small Business Computer Environment. New York: American Institute of Certified Public Accountants, 1981.

This 34-page handbook is intended to familiarize the auditor with the minicomputer environment, and acquaint him with control considerations that apply to that environment. An appendix covers hardware and software features of the minicomputer.

JOURNALS

Berkman, Robert E. "Specifics of Broad Overview While Auditing Own System Offers Productivity Answers." Computerworld, 16, No. 37 (September 13 1982), 89.

Berkman advises small systems users to regularly take a broad overview of their entire system to ensure that it is working at an optimal level. The review should include programs, procedures, personnel, and the use of the information generated by the computer. Points to examine during the system audit include: data integrity, systems controls; data validation; management information; operational effectiveness; missing requirements; operating environment; personnel dependency; and documentation.

Birtle, William G., Barry D. Hawkins, and Walter D. Pugh. "How to Evaluate Accounting Controls in a Minicomputer Installation." The Practical Accountant, 13, No. 6 (September/October 1980), 47-53.

Potential control weaknesses in minicomputer installations are discussed in this article, as are models to deal with these weaknesses. Access to input devices often is widespread. This can be controlled by strict security over passwords. Another potential weakness is the lack of adequate audit trails. The author suggests the provision of a transaction log file to alleviate this problem.

Brown, Nander. "Check Security Before Going Mini: Brown." Computerworld, 16, No. 30 (July 26, 1982), 63-64.

The author outlines the problems associated with the purchase of a minicomputer by an inexperienced user, such as the lack of hardware and software security, loss of audit trails, and inadequate backup of data.

Brown, Nander. "Question of Auditability Paramount." Computerworld, 16, No. 32 (August 9, 1982), 61-64.

Before a minicomputer system is purchased, management should determine if the system under consideration is auditable. The system must have a network of internal controls and the management/audit trail should be adequate. An auditable system includes the following elements; clear, precise auditing procedures; established methods for correcting erroneous data and re-entering it into the system; inclusion of automatic audit techniques; system documentation that deals with internal controls and audit trails; and a means to evaluate system performance. The author also includes a short discussion of computer security.

Fedak, Charles E., and Alfred R. Michenzi. "Basic Internal Control for the Small Computer User." Practical Accountant, 13, No. 4 (June 1980), 61-70.

The authors present reasons why small computer users should develop internal controls and discuss some of the most effective ways to do so. Controls are said to be necessary for the protection of assets, privacy, accuracy of data, system survivability in the event of natural disaster, and protection of management. The control of computer personnel is seen as vital to system security and separation and rotation of duties is highly recommended. Recovery procedures in the event of computer shut-down, such as back-up files, programs, and logs should be well documented. The article also discusses physical security and input, output, and processing controls.

Hodge, Robert D. "Auditing 'Micro' Systems." EDPACS, 7, No. 9, (March 1980), 1-5.

One audit approach to the proliferation of microcomputers in commerce and industry is the use of the audit minicomputer. Advantages of this minicomputer are discussed, as well as various methods of interfacing it to another small system.

Shearon, Winston, Charles Butler, and James Benjamin. "Audit Aspects of Small Computer Systems." The CPA Journal, 50, No. 8 (August 1980), 17-21.

The literature available regarding auditing in a small systems environment is extremely limited. The author identifies several problem areas with EDP audits of small systems, including the lack of formalized policies and procedures governing control of transactions; the failure to segregate the functions of EDP personnel in small firms; the difficulty of ensuring input accuracy in small systems; and the increasing complexity of micro and minicomputer software.

Verbit, Alan C. "Micro and Minicomputers in a Self-administered EDP Audit." Office, 95, No. 7 (July 1982), 94-96, 113.

The author provides a questionnaire designed for small businesses to enable them to assess the adequacy of their computer systems' internal controls. Frequent problems which may need to be addressed include: lack of control over program changes; insufficient backup procedures; excessive ease of access to programs and files; insufficient processing controls; and lack of segregation of duties. The questionnaire provided should enable management to determine the need for additional audit expertise.

Warren, Andrew. "Controls and the Minicomputer: An Auditor's View." Accountancy, 92, No. 1060 (December 1981), 119-120.

The article reviews problems which may occur when an unsuitable minicomputer is purchased. The size of the computer is very important since a computer that is too small for the job will be overloaded, break down, and may result in data processing staff cutting corners and bypassing control procedures. Pre-written software packages purchased for the minicomputer frequently are poorly designed. Input procedures for the minicomputer require little checking against error and are difficult to control. Many transactions are entered without any validation of numbers. The article also discusses the necessity of separating responsibilities for data input.

Zimmerman, Harry. "Microcomputers: The Challenge for Controls." Journal of Accountancy, 149, (June 1980), 28-35.

Zimmerman discusses the methods for improving controls for minicomputer systems, including instituting physical access restrictions; computer program and data file restrictions; and special control totals.

ONLINE COMPUTER SYSTEMS

Cerullo, Michael J. "Controls for On-Line Real-time Computer Systems."

CA Magazine, 113, No. 5 (May 1980), 54-58.

The article discusses the importance of audit trail controls for on-line, real-time systems. The audit trail should do the following: allow management to assess the accuracy of the data in the system; allow auditors to test the system; allow government information standards to be met; and allow the reconstruction of database files in case of a catastrophe. New control techniques, including single transaction and group transaction controls also are discussed. Single transaction controls are used to ensure the accuracy and reliability of each transaction. Group transaction controls are used to monitor groups of messages entered during given time periods. Examples of these include: periodic file dumps; attachments of printers to the input device; and transaction logs. Techniques for controlling database management systems also are discussed.

Chan, Chi-yip. "Online Realtime Data Base Systems Must be Managed to

Reflect Revolution from Batch." DM, Data Management, 19, No. 7

(July 1981), 11-13.

Chan concentrates on the features of on-line systems that contribute to audit difficulties. These include: elimination of source documents; loss of management control due to instantaneous system response time; tendency of transactions to be "invisible"; high degrees of integration often resulting in total system failure; and a high level of user diversity. Security often is at risk in these systems. Input devices can be abused. Transmission lines can be tapped. Data can be altered. Audit trails are buried within the system. The author believes audit involvement in systems development is essential to eliminate these problems.

Jeffries, Kenneth R. "Auditing Advanced EDP Systems--The Problems Still Exist." National Public Accountant, (July 1981), 16-21.

Advanced EDP systems are defined as having one or more of the following features: telecommunications; data integration; automatic transaction initiation; or an unconventional or temporary audit trail. Jeffries then discusses how systems with these features differ from batch systems. Secure operating systems should meet the following requirements: 1) the system is protected from user processes; 2) the system protects users from each other; 3) system protects users from themselves; 4) system protects itself from itself; 5) the system is protected from its environment. Special tools and techniques available for auditors who work with advanced systems include flow-charting packages that enable auditors to closely examine program logic. Decision table analysis packages can produce program logic in decision table format. Real-time notification is a technique that is a continual analysis of transactions for audit purposes. Several other techniques also are discussed in this article.

Johnson, Everett. "On-line Systems--Should the CPA be Concerned?" Outlook, 49 No. 1 (June 1981), 59.

Johnson maintains that the use of online systems does not necessarily lead to reduced levels of control and auditability. Accountants should concern themselves with key issues relating to online systems, however, including the adequacy of controls limiting terminal access, the existence of data validation and error correction facilities; and what happens to data following system failure.

Kropatkin, Philip. "Online Auditing." Government Accountants Journal, 30, (Spring 1981), 47-49.

The advantages of the online auditing technique, especially its timeliness, are discussed. The online auditing approach is being used by the Department of Health and Human Services, and a description of its use in auditing university contracts with the federal government is provided.

Patrick, Robert L. "Integrity Considerations in Distributed Systems."

Edpacs, 8, No. 2 (August 1980), 1-6.

This article lists techniques for dealing with the complexity of auditing distributed systems, and explains why distributed systems are so difficult to control. Patrick mentions problems arising from geographical dispersion of terminals, and the use of systems by casual users rather than computer professionals.

Vanecek, Michael T., and George Scott. "Data Bases--The Auditor's Dilemma." CPA Journal, 50, No. 1 (January 1980), 26-35.

The author focuses on the complexity of database systems and the implications of this complexity on auditing. Auditors will need to understand entire database management systems and their data flows in order to perform effectively, and will need to be on guard against hidden program bugs in the system.

SPECIAL AUDIT TECHNIQUES

JOURNALS

Didis, Stephen K. "Solving the Dilemma of Scarce EDP Audit Resources."

The Internal Auditor. 39, No. 6 (December 1982), 38-40.

The author addresses methods of allocating scarce EDP audit resources through the incorporation of a control assurance plan into an organization's system development methodology. This policy would require the existence of control, auditability, and security guidelines within a formal EDP systems methodology. It also would require formal system-project reviews to assure compliance with the guidelines. Also, it is the line management level that that should do the risk assessment of EDP applications.

Dowell, C. Dwayne, and James Arthur Hall. "EDP Controls with Audit Cost

Implications." Journal of Accounting, Auditing & Finance, 5, No. 1

(Fall 1981), 30-40.

This article identifies several system development and maintenance (SDM) controls that can be used to determine application integrity in EDP systems.

Holley, Charles L., and Daniel M. Cash. "Evaluations of EDP Systems

Development." Journal of Systems Management, 32, No. 6 (June 1981).

16-21.

The authors define the concept of a new systems development review, explain why these are advantageous, and discuss the role of the EDP auditor in the systems development process. They present current methods for quantifying risks associated with computer systems in view of the need to carefully allocate scarce EDP audit resources. Three methods of risk analysis are presented, two of which involve ranking schemes, and one involving calculating expected losses. After discussing these methods, the authors conclude that the systematic ranking method of risk analysis assists in the determination of the extent of involvement of auditors in the system development cycle, and allows for successful allocation of EDP resources.

Humphries, Ken. "Audit Routines on Mainframe Data." The Accountant, 184, No. 5532 (March 5, 1981), 14.

In order to tap the increasing power of the next generation of computers, audit techniques will become more productive. One solution may be the use of software packages which contain a substantial number of audit routines that can be used to access data on a complex mainframe. Good software packages are easy to learn, easy to use, self-documenting, consistent, and accurate.

Johnson, Everett. "Using Computer-Assisted Auditing Procedures." Outlook, 48, No. 3 (December 1980), 65.

Some applications of CAAPS (Computer-assisted auditing procedures) are discussed, including the use of this technique for payroll audits and inventory audits. CAAPS may be developed in-house or may be acquired as a packaged program. Advantages of both are briefly discussed.

Korte, H. E. "Auditing Computer Systems in the Australian Auditor General's Office." International Journal of Governmental Auditing, 9, No. 1 (January 1982), 7-8.

This article outlines the approach of the Australian Auditor-General in dealing with the proliferation of computers in government and business. He discusses the use of Touche Ross's STRATA software package, as well as the CARS audit software package developed by Cullinane Corporation in Boston. The training needs of non-data-processing auditors have been met by adapting two courses in computer auditing produced by the Canadian Institute of Chartered Accountants.

Leininger, Eugene T. "Segmentation of the EDP Auditing Engagement."

Internal Auditor, 39, No. 3 (June 1982), 27-29.

The strengths and weaknesses of the segmentation technique of EDP auditing are reviewed in this article. This technique is a means of breaking down highly complex auditing engagements into logical segments which can be audited individually. Segmentation planning uses a chart to describe the approach for condensing audit and control requirements in EDP and audit terms while retaining the comprehension of non-EDP personnel. This is the CARS/ATOM chart. The acronym stands for control, auditability, recoverability, security/application, topic operation management. The author foresees a dramatic impact of the segmentation techniques on EDP auditors and predicts a series of miniaudits will replace the traditional, operational audit.

Lo, Adrian. "EDP Auditing Based on Professional Standards." EDPACS, 8, No. 3 (September 1980), 1-14.

The author describes an EDP audit approach developed and implemented by the Bank of Montreal in 1977. The audit approach consists of the following three stages: a pre-audit stage, audit test stage, and post-audit stage. The author claims this approach is easy to learn and apply, cost-effective, and relevant to all aspects of EDP auditing.

McGuire, Patrick T. "Using an Integrated Test Facility." The Internal Auditor, 39, No. 2 (April 1982), 46-49.

The advantages and disadvantages inherent in the use of an ITF (integrated test facility) approach are presented. The author was involved in the creation of the ITF for the Pillsbury Company's corporate offices. The author believes that although the ITF technique is complex and requires a high level of technical skill, it is cost-effective in actual resources used and can enhance the quality of audit engagements.

Mills, Lou. "The World According to GAAP." DM, Data Management, 20, No. 7 (July 1982), 54.

Weaknesses contained in much of the available mini and microcomputer accounting software are discussed in this one-page article. Some of these weaknesses include: file size restrictions that cause accounting data for previous periods to be summarized and individual records to be dropped; and the easy modification of accounting data without the creation of an audit trail. Also, the author points out that sophisticated audit software frequently will not run on mini and micro systems. Because of these problems, auditors in Great Britain are even considering draft standards that might lead to the elimination of several financial reporting packages sold for small computers.

Moeller, Robert R. "Launching the EDP Preimplementation Audit." EDPACS, 9, (March 1982), 1-6.

EDP audit resources often are limited. Because it is far more cost-effective to modify computer systems during their design phase, some method must be established to determine which systems will receive EDP preimplementation audits. This article discusses a method for rating the importance of systems projects according to these six factors: impact of the system on management decisions; current status of the system; relationship with and impact on other systems; technical complexity of the system; impact of system failure; and types of application controls surrounding the system. Also reviewed are building blocks considered to be important parts of all EDP audits.

Whisnant, Susan R., and J. W. Martin. "What is Cycle Auditing?" Management Accounting, 64, No. 4 (October 1982), 52-55.

Because the cycle audit focuses on the accounting process itself and on accounting controls, it is a particularly useful technique for auditing computer-based information systems. The author explains cycle auditing and its advantages, including the more direct involvement of the auditor in the client's internal control systems, and the more purposeful, less routine nature of this type of auditing.